REMARKS

Reconsideration is respectfully requested.

By the above amendments, the objected to Claims 35 and 36 have been amended to correct for typographical errors.

Applicants note with appreciation the indication of allowable subject matter in claims 31 to 34 and 40 to 43. However, Applicants respectfully suggest that the rejection of the other claims of this application, particularly independent claims 23 and 35, as being obvious in the light of the prior art is improper. It appears that the basic thrust of the present invention has not been appreciated, which is the reduction or elimination of interference between adjacent base stations in a cellular wireless communication system.

A conventional cellular wireless communication system has base stations which define overlapping cells of coverage. The effect of this is that each cell has a central, interference-free zone, and an outer zone which overlaps with outer zones of one or more adjacent cells. Where the zones of coverage of adjacent cells overlap, interference can take place between the relevant base stations. This problem is addressed in conventional cellular networks by causing adjacent base stations to transmit using different resources (e.g. on different frequencies and/or using different time slots) to avoid interference. This inevitably causes a reduction in the overall capacity of the network. See the "Background of the Invention" of the present application text as: page 1, paragraph 2 to page 2, first full paragraph.

The present invention deals with the problem of interference between base stations in a completely different way. Instead of having overlapping zones of coverage, adjacent base stations have zones of effective coverage (that is, cells) which do not

overlap with the zones of effective coverage of adjacent base stations. In other words, there are "gaps" in the coverage of the base stations, or "zones of reduced coverage between the base stations," as recited in the claims. Clearly, then a transmission from a mobile station within the zone of effective coverage of a particular base station will not interfere with adjacent base stations. Also, a transmission from a mobile station in such a zone of reduced coverage will not, by definition, interfere with any nearby base station. In order for communication between such a mobile station and any base station to occur, the mobile station utilizes a relay station (typically, another mobile station) located within the zone of effective coverage of the destination base station.

Put another way, a mobile station in a zone of reduced coverage wishing to contact any nearby base station would, if it could transmit at a high enough power level (or used another transmission resource sufficiently intensively) be able to reach the destination base station, but would then be likely to interfere with an adjacent base station. Instead, by transmitting a low power/low resource usage signal to a nearby mobile station within the zone of effective coverage of the destination base station, a non-interfering transmission takes place, which would be itself neither reach the destination base station nor interfere with an adjacent base station. The mobile station acting as a relay station is within the cell or zone of effective coverage of the destination base station, and can therefore transmit normally to relay the message to the base station without risk of interference with adjacent base stations.

With respect to the rejection of Claims 23-25 and 35-33 as obvious over Padovani (USP 5,9937,019), it should first be noted that this patent relates to "Reliable intersystem handoff in a CDMA System". As described in the specification at column 1, line 56 to

column 2, line 3, a handoff scheme is used to allow communication between a mobile station and a destination station to continue even when the mobile station moves from a first base station's cell to a second, adjacent base station's cell. It is implicit that the zones of coverage or cells of the adjacent base stations must overlap in such a scheme. In the final sentence of the above-cited passage from Padovani, it is clear that the remote unit (mobile station) signal must be received simultaneously by two different base stations, a current base station and a neighbouring base station. Depending on the relevant signal strength measurements, the system controller transfers the connection from the current base station to the neighbouring base station. In other words, the "zones of effective coverage" of the two base stations overlap.

Contrary to the assertions in the rejection, Padovani does not disclose a cellular system with non-overlapping areas of coverage. In the passage referred to (column 10, lines 22 to 30 and Figure 3A), the shaded zone between the lines 182 and 188 is in fact a zone of overlapping coverage between the base stations 150 and 165. The final sentence of the passage in question points out that the diagram is not drawn to scale and "in reality the coverage area overlap regions are relatively narrow as compared to the total coverage area of each base station." The rest of the passage makes it explicitly clear that the base station 150 has a zone of coverage which extends up the line 188, while the base station 165 has a zone of coverage which extends up to the line 182. Immediately preceding the cited passage (column 10, lines 9 to 22) it is made explicitly clear that the region 160 intermediate the lines 182 and 188 is a region within which "the signal strength from both base station 150 and base station 165 is a sufficient level to support communication with

remote unit 155". In other words, there is full overlap between the cells or zones of effective coverage of the two base stations in the zone 160.

It is also worth noting the statement at line 12 of this passage: "Note that due to the nature of the FM system, base stations 150 and 165 cannot communicate simultaneously with remote unit 155". See also lines 18 to 22. "Base station 165 never transmits on any frequency used by base station 150 and thus base station 165 provides nominally no interference to the communication between base station 150 and any remote unit with which it is in communication". In other words, this is the classic prior art type of cellular system discussed as background on pages 1 and 2 of the present application. In this system, avoidance of interference in overlapping cells is achieved by the use of different frequencies, with a resultant reduction in capacity of the base stations.

Confusion may lie in the phrase "zone of reduced coverage between the base stations" with a zone of reduced signal strength, as would be the case in the overlap zone 160 in Figure 3A of Padovani. However, the phrase is used in a specific sense in the present application, which is made clear from a reading of the document as a whole, and could even be a zone in which there is not coverage at all.

The examiner concedes that Padovani fails to disclose the relaying of a message between the mobile station in the zone of reduced coverage and the base station by a relay station. This is of course so, since in a fully overlapping cellular system there would not normally be any need for such relaying. Instead, a mobile station would always be within range of at least one base station, and there should be no deliberately introduced zones of reduced coverage (in the sense of the present application) in areas where network coverage is required.

Uratini (GB 2,291,564) is cited as disclosing the relaying of a message between a mobile station and a base station via a relay station. Applicants agree that Uratini discloses the relaying of a signal from a remote station to a base station via an intermediate station which is within a zone of coverage of the base station. However, it should firstly be pointed out that Uratini does not disclose a cellular communication system in the sense of the kind of system disclosed in the present application or by Padovani. In this regard, the introductory portion of Uratini, concluding with the sentence on lines 20 and 21 on page 2, makes it clear the Uratini is concerned with a communication system comprising "only one base station". The entire description of Uratini is consistent with there being only a single base station, apart from the final sentence on page 16, which mentions in passing the possibility of similar base stations which can communicate with the base station 11 "either through radio channels or through wired cables". Even this is not a cellular communication system. In other words, Uratini does not in any sense disclose a cellular communication system and is therefore of limited relevance to the present invention.

More importantly, there is no motivation to adapt the system of Padovani by incorporating the relaying feature of Uratini, since Padovani teaches a cellular system does not have non-overlapping cells of base station coverage and there is therefore no need to relay signals from mobile stations outside an area of coverage of a base station. It is respectfully suggested that the motivation for such combination lies in the present application only, and thus the combination is a case of improper hindsight reasoning. Furthermore, even if the systems of Padovani and Uratini were somehow to be combined, the result of the present invention, namely the reduction of interference between adjacent

base stations, would not be achieved for the reasons indicated in column 10, lines 9 to 30 of Padovani.

For the present invention to work, it is necessary that zones of reduced coverage exist between the zones of effective coverage of adjacent base stations (that is, the base stations must have zones of coverage or cells which do not overlap) so that each base station can make full use of the resources available to it within its own zone of effective coverage. This solves the problem of reduced capacity experienced by conventional cellular networks. However, without any further measures being taken, this would result in numerous dead zones between the base stations within which a mobile station would not be able to communicate at all. For this reason, the invention provides a relaying function between mobile stations, so that a mobile station in such a dead zone need only reach another mobile station which is nearby but is within the zone of effective coverage of a base station in order to communicate with that base station.

In light of the above remarks, it would not appear necessary to deal exhaustively with the remaining cited references in addition to Padovani and Uratini. However, the following brief comments on Cook (USP 6,005,884) and Rautiola (USP 5,752,197) are made.

Cook relates to a data communication system for a computer network which utilizes a number of radio repeaters to communicate with remote terminals. The repeaters effectively extend the overall coverage area of the system without requiring the installation of another fully featured base station. The cited passage (column 31, lines 26 to 33) describes a pair of repeaters 18' and 18" which share the same coverage area and thereby supply a redundant communications capability. It is not entirely clear what the

relevance of this reference is to the present invention. In the context of claim 26, it can perhaps be noted that the relay station referred to is most likely a further mobile station. Likewise, the originally referred to "at least one relay station" will normally be another mobile station. This was not claimed explicitly, as the relaying of messages between mobile stations forms the subject of other patent applications of the present applicant, but the inclusion of a further dependent claim after claim 26, making it clear that the at least one relay station and/or the at least one further relay station are mobile stations is illustrative.

The citation to Rautiola (USP 5,752,197), is for a method for adjusting transmission power in a cellular system. This reference describes a system for dealing with the interference which occurs in an adjacent base station when a particular channel is used between a specific base station and a subscriber (mobile) station, see column 2, lines 12 to 42. In order to deal with this problem, Rautiola proposes that the transmisson power used for a particular communication is adjusted to be as low as possible. Obviously, the lower the power used for a particular transmission, the less interference will be caused to nearby base stations. This reference does not appear to be highly relevant to the present invention.

For the above reasons, reconsideration and withdrawal of the outstanding rejections and objections are respectfully requested, and a Notice of Allowance as to all pending claims is earnestly solicited.

Respectfully submitted,

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